

WHAT IS CLAIMED IS:

1. A cold-formed spring having high fatigue strength and high corrosion fatigue strength, which is made of a wire made from a steel material containing, in weight percentage, 0.45 to 0.52% of C, 1.80 to 2.00% of Si, 0.30 to 0.80% of Ni, 0.15 to 0.35% of Cr and 0.15 to 0.30% of V, with Fe substantially constituting the remaining percentage, and which is hardened and tempered by a high-frequency heating process.

2. The cold-formed spring according to claim 1, wherein the percentage of P is 0.025% or lower and the percentage of S is 0.020% or lower.

3. The cold-formed spring according to claim 2, wherein the wire has a tensile strength of 1800 to 2000 MPa and a reduction of area of 35% or higher after being hardened and tempered by the high-frequency heating process.

4. The cold-formed spring according to one of claims 1-3, wherein the wire has a hardness of 50.5 to 53.5 HRC after being hardened and tempered, and the spring is subject to a shot peening process so that the residual stress at 0.2 mm depth from the surface becomes -600 MPa or higher.

5. A method of manufacturing a coil spring having high fatigue strength and high corrosion fatigue strength, wherein the spring is made from a steel material containing, in weight percentage, 0.45 to 0.52% of C, 1.80 to 2.00% of Si, 0.30 to 0.80% of Ni, 0.15 to 0.35% of Cr and 0.15 to 0.30% of V, with Fe substantially constituting the remaining percentage, and the method comprises the steps of making a wire from the steel material, hardening and tempering the wire by a high-frequency heating process and cold-coiling the

wire into the spring.

6. The method according to claim 5, wherein the high-frequency heating process includes the steps of hardening the wire at a temperature of 920 to 1040 °C for 5 to 20 seconds, rapidly cooling the wire, and tempering the wire at a temperature of 450 to 550 °C for 5 to 20 seconds.

7. The method according to claim 6, wherein the hardening temperature is within the range from 940 to 1020 °C and the tempering temperature is within the range from 480 to 520 °C.

8. The method according to claim 6, wherein the wire is rapidly cooled after being tempered.

9. A type of steel material for cold-forming a spring hardened and tempered by a high-frequency heating process, containing, in weight percentage, 0.45 to 0.52% of C, 1.80 to 2.00% of Si, 0.30 to 0.80% of Ni, 0.15 to 0.35% of Cr and 0.15 to 0.30% of V, with Fe substantially constituting the remaining percentage.

10. The steel material according to claim 9, wherein the percentage of P is 0.025% or lower and the percentage of S is 0.020% or lower.